Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Sorting Category: E10. (T)

The number of $J = 0$ pairs in ^{44,46,48}Ti
LARRY ZAMICK, ALBERTO ESCUDEROS and ARAM
MEKJIAN
(Rutgers University)

In the single j-shell, the configuration of an even–even Ti
isotope consists of 2 protons and n neutrons. The $I = 0$ wave
function can be written as

$$\psi = \sum_{Jv} D(J, Jv)[(j^2)_\pi^J (j^n)_\nu^J]^{I=0},$$

where v is the seniority quantum number. There are several states
with isospin $T_{\min} = |(N - Z)/2|$, but only one with $T_{\max} = T_{\min} +$
2. By demanding that the $T_{\max}$ wave function be orthogonal to
the $T_{\min}$ ones, we obtain the following relation involving a one-
particle coefficient of fractional parentage:

$$D(00) = \frac{n}{2j + 1} \sum_J D(J, Jv)(j^{n-1}(jv = 1)j|j^n J)\sqrt{2J + 1}.$$

This leads to the following simple expressions for the number of
$J = 0$ np pairs in these Ti isotopes:

- For $T = T_{\min}$, # of pairs $(J_{12} = 0) = 2|D(00)|^2/n$

- For $T = T_{\max}$, # of pairs $(J_{12} = 0) = 2n|D(00)|^2 =$
$$= \frac{2n(2j+1-n)}{(2j+1)(n+1)}$$

For ^{44}Ti we have also the results for even J_{12}

of nn pairs = # of pp pairs = # of np pairs = $|D(J_{12}, J_{12})|^2$.